SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Electronics, Telecommunications and Information Technology
1.3	Department	Communications
1.4	Field of study	Electronics and Telecommunications Engineering
1.5	Cycle of study	Master of Science
1.6	Program of study/Qualification	Multimedia Technologies/ Telecommunications/ Master
1.7	Form of education	Full time
1.8	Subject code	TM-E15.00/ TC-E17.20

2. Data about the subject

2.1	Subject name					Database Design and Programming					
2.2	Subject area					Electronics and Telecommunications Engineering					
2.3	Course responsible/lecturer					Associate Professor Bogdan ORZA, PhD					
2.4	Teachers in charge of applications					Associate Professor Bogdan ORZA, PhD Associate Professor Serban MEZA, PhD					
2.5	Year of study	II	2.6	Semester	1	2.7	Assessment	Exam	2.8	Subject category	DA/DI

3. Estimated total time

Year/ Sem.	Subject name	No. of weeks	Course [hours/ week]	Applications [hours/ week]			Course [hours/ semester]	Applications [hours/ semester]			Indiv. study	TOTAL	Credits
				S	L	P		S	L	P			
II/1	Database Design and Programming	14	2	0	1	0					58	100	4

3.1	Number of hours per week	3	3.2	of which, course	2	3.3	applications	1
3.4	Total hours in the curriculum	42	3.5	of which, course	28	3.6	applications	14

Individual study	Hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	20
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	15
Tutoring	-
Exams and tests	3
Other activities	

3.7	Total hours of individual study	58
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Relational databases
4.2	Competence	General knowledge of the purpose of a database High level knowledge of programming with SQL

5. Requirements (where appropriate)

5.1	For the course	Cluj-Napoca
5.2	For the applications	Cluj-Napoca

6. Specific competences

7. Discipline objectives (as results from the key competences gained)

7.1	General objectives	Developing the competences regarding to design a database and use PL/SQL- Oracle's procedural extension language for SQL to extract data from an ORACLE Database
7.2	Specific objectives	1. Understanding how to analyze complex business scenarios, design and create data models and create databases using SQL, 2. Developing skills to use Oracle SQL Developer Data Modeler and Oracle Application Express (APEX) in database design activities, 3. Understanding programming with PL/SQL, Oracle's procedural extension language for SQL and the Oracle relational database, 4. Understanding the differences between SQL and PL/SQL and exploring how PL/SQL is used to extend and automate SQL in administering the Oracle database, 5. Developing skills and abilities to use ORACLE APEX to create applications using SQL and PL/SQL.

8. Contents

8.1. Lecture (syllabus)		**Teaching methods**	**Notes**
1	Data modelling • data and information, • history of the database, • conceptual and physical models	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Use of .ppt presentation, projector
2	Logical model – Entity-Relationships Diagram ERD • entities, instances, attributes and identifiers • identifying relationships • ERD conventions, ERD validations • adding and using Data Types • using Oracle SQL Developer Data Modeler for ERD		
3	Normalizing ERD • about normalization • different form of normalization (1NF, 2NF, 3NF, others)		
4	Transforming logical model to a relational design • Mapping ERD to a Relational Database Design		

8.1. Lecture (syllabus)		Teaching methods	Notes
	• Analyzing Relational Model • Denormalizing Relational Design • Physical models • Generating Database		
5	Oracle Application Express - SQL Workshop • Managing Database Objects • Using SQL Commands tool • Using SQL Scripts • Using APEX utilities – data workshop, generating DDL, managing methods on tables, using query builder, monitoring database		
6	Introduction to PL/SQL • Benefits of PL/SQL • Defining variable in PL/SQL • Interacting with Database server – using SQL in PL/SQL		
7	Programming with PL/SQL • Writing control structures • Working with composite data types • Using cursors and parameters • Handling exceptions		
8	Using and managing procedures • creating procedures • using parameters in procedures • passing parameters		
9	Using and managing functions • creating functions • using functions in SQL statements • managing procedures and functions		
10	Using and managing packages • creating packages • managing package concepts • using Oracle PL/SQL packages • improving PL/SQL performance		
11	Using and managing triggers • creating DML triggers • creating DDL and database event triggers • managing triggers		
12	Oracle Application Express – creating application 1 • Application types • APEX reports • Integrating media objects in APEX – images, graphics, map chart, • embedded multimedia object • Authentication options		
13	Oracle Application Express – creating application 2 • Navigation bar and menus • APEX forms • Using JavaScript, HTML5 and CSS3 to APEX application • Publishing from APEX – export CSV, PDF, using Oracle BI Publisher		
14	Recapitulation. Preparation for the final exam.		
8.2. Applications (lab)		Teaching methods	Notes
1	Introduction – creating APEX account, install ORACLE tools, presenting the practical activity	Didactic and experimental proof, didactic exercise, team work	Use of laboratory computers, magnetic board
2	Logical model – Entity-Relationships Diagram ERD		
3	Normalizing ERD		
4	Transforming logical model to a relational design		
5	Oracle Application Express - SQL Workshop		
6	Introduction to PL/SQL		
7	Programming with PL/SQL		

8.1. Lecture (syllabus)		Teaching methods	Notes
8	Using and managing procedures		
9	Using and managing functions		
10	Using and managing packages		
11	Using and managing triggers		
12	Oracle Application Express – creating application 1		
13	Oracle Application Express – creating application 2		
14	Lab recovery and finalization of project activity		

Bibliography

1. R.K. Stephens, R.R. Plew – Database design, 2001 Sams Publishing, 0-672-31758-3
2. T. Connolly, C. Begg – Database solutions, 2004 Addison Wesley, 0-321-17350-3
3. B. Rosenzweig, E. Rakhimov - Oracle PL/SQL by example, 2008 Addison Wesley, 0-137-14422-9
4. M.Plas, M. Zoest – Oracle APEX Cookbook, 2013 Packt Publishing, 978-1-78217-967-2

On-line references

1. B. ORZA, Database Design and Programming. Technical University of Cluj-Napoca, 2016 – available on O365 portal, in Class Notebook section - https://portal.office.com/

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

10. Evaluations

Activity type	10.1	Assessment criteria	10.2	Assessment methods	10.3	Weight in the final grade
Course		The level of acquired theoretical knowledge and practical skills		- 2 summative evaluation tests (theory and exercises)		- E1, max 10 pts. 20% - E2, max 10 pts. 20%
Applications		The level of acquired abilities		- Continuous formative evaluation – laboratory activity portfolio L		- L, max. 10 pts. 20%
				- final project - P		- P, max. 10 pts. 40%
10.4 Minimum standard of performance						
E1≥ 4.5 and E2≥ 4.5 and L ≥ 4.5 and P ≥ 4.5						

Date of filling in
1.10.2018

Course responsible
Associate Professor
Bogdan ORZA, PhD

Teachers in charge of applications
Associate Professor
Serban MEZA, PhD

Date of approval

1.10.2018

Head of Communications Department

Professor Virgil DOBROTA, PhD